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THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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The application to the Survey work and problems of the quotation on page 49 is obvious.

THREE ANTHRACNOSES OF ALFALFA

Fred Reuel Jones and J. L. Weimer

In August 1939 the writers found upon alfalfa in a nursery at Griffin, Georgia, 2 species of Colletotrichum which are reported so infrequently upon this host that their occurrence may deserve comment. Some of the nursery rows attracted attention by reason of the extensively blackened stems of the plants and partial defoliation. The acervuli characteristic of Colletotrichum were readily found on the stems, but not until spores had been cultured were the 2 species present in mixture distinguished.

One species has been tentatively identified as C. destructivum O'Gara, a species that has been reported on this host twice previously, once in Kentucky and once in Georgia (PDR 17: 44, 1933 and 21: 170, 1937). The cultures obtained appear like those from an excellent unmixed collection made by H. Jackson Smith from alfalfa at Columbus, Ohio, earlier in the summer, and also like one obtained from sweetclover (Melilotus alba) in early autumn at Madison, Wisconsin. This fungus has also been found by Valleau on sweetclover in Kentucky (PDR Suppl. 86: 28, 1935).

The other species found in the mixture at Griffin, Georgia was sporulating freely on the host and the spores appeared indistinguishable from those of C. graminicola (Ces.) Wilson on cereals. The writers have found no published description of such a species on alfalfa. However, Selby in 1910 (Bul. Ohio Agr. Expt. Sta. 214: 367) notes that a species of Colletotrichum in addition to C. trifolii Bain occurs upon alfalfa in Ohio, but he does not describe the disease or the fungus causing it. However, in a letter to Dr. L. R. Jones dated May 25, 1915, Selby writes, "I may state that Mann's grain anthracnose, Colletotrichum cereale, has appeared in this State to produce injuries upon alfalfa and red clover most resembling those characteristic of Pseudopeziza." Thus C. cereale, or C. graminicola, as it is now known, is probably the second species upon alfalfa which Selby mentioned but did not describe in his Brief Handbook of the Diseases of Cultivated Plants in Ohio.

As a further report of this fungus on forage legumes, Lawrence Henson gives the writers permission to state that he has cultured Colletotrichum graminicola from alfalfa stem lesions and also from red and white clovers at Lexington, Kentucky.

A third, and the most commonly reported species of Colletotrichum upon alfalfa is C. trifolii.

Thus it appears that three species of Colletotrichum distinguished by spore size and shape may cause anthracnose of alfalfa in the Southern States. Two species have straight spores, those of C. trifolii being

mostly 10 to 12 microns long, and those of the presumable C. destructivum being mostly 14 to 18 microns long. One species resembling C. graminicola has spores distinctly curved and about 25 microns long. It is hoped that persons collecting these anthracnoses of alfalfa will deposit specimens with the Plant Disease Survey where they will be available for comparison.

(Division of Forage Crops and Diseases, U. S. Bureau of Plant Industry, Wisconsin and Georgia Agricultural Experiment Stations cooperating).

SPREAD OF WHITE PINE BLISTER RUST DURING THE CALENDAR YEAR 1939

(Contributed by the Bureau of Entomology and Plant Quarantine).

In the Appalachian region south of Pennsylvania, blister rust [Cronartium ribicola] was found for the first time on Ribes in Kent County, Delaware; Calvert and Prince Georges Counties, Maryland; Albemarle County, Virginia; and Preston County, West Virginia. On white pine it was found for the first time in Greene County, Virginia, and in Hardy, Tucker, and Pocahontas Counties, West Virginia. This represents an extension of the disease to the southward on Ribes of 1 county in Delaware and 2 counties in Maryland. Within a few of the previously known infected counties in the Southern Appalachian region, there was general infection on Ribes and some increase of the disease on white pine [Pinus strobus].

There was considerable spread of the rust in the North Central Region. It was found on Ribes for the first time in 13 counties in Ohio, 9 in Iowa, 1 in Michigan, 2 in Wisconsin, and 2 in Minnesota. In 67 percent of these counties the rust was found on Ribes nigrum, indicating the importance of this species in the distribution of the disease. Blister rust on white pine was found in 2 counties in Ohio, 2 in Michigan, 2 in Minnesota, and 1 in Wisconsin. In Wisconsin, the rust has now been found in every county in the State on either pine or Ribes, or on both host plants. The disease spread in Ohio as far south as Champaign County where it was found on Ribes. This is an extension of about 50 miles over its previously known distribution and may be the result of long distance spread of aeciospores from the North and East. In Iowa, most of the spread occurred in the northeast quarter of the State. However, O'Brien and Dickinson Counties in the northwestern part of the State were reported infected. All of the findings in Iowa were on the cultivated black currant, R. nigrum. It appears likely that most of the spread in Iowa came from pine infection centers in southern Minnesota.

In the Northeastern States, the rust is generally prevalent on both host plants and continues to spread unchecked from Ribes to pines in non-protected areas. Observations on the spread of the disease in protected

Counties in Which Blister Rust Was Found for the First Time on White Pines or Ribes in 1939 by States and Regions

Region	State	County	Infection found on: Pine	Ribes	Host plant	Month found
Southern	Dela.	Kent		X	R. sativum	Aug.
Appal-						
achian	Md.	Calvert		X	R. (sp. undetermined)	"
"	"	Prince Georges		X	R. americanum	Sept.
"	Va.	Albemarle		X	R. rotundifolium	Oct.
"	"	Greene	X		P. strobus	"
"	W.Va.	Hardy	X		P. strobus	May
"	"	Tucker	X		"	"
"	"	Pocahontas	X		"	July
"	"	Preston		X	R. rotundifolium	Sept.
North	Ohio	Cuyahoga	X		P. strobus	Jan.
Central	"	Carroll	X		"	May
"	"	Carroll		X	R. cynosbati	June
"	"	Medina		X	"	Aug.
"	"	Coshocton		X	R. americanum	Sept.
"	"	Erie		X	R. cynosbati & aureum	"
"	"	Huron		X	R. cynosbati	"
"	"	Ottawa		X	R. nigrum	"
"	"	Marion		X	"	Oct.
"	"	Hardin		X	"	"
"	"	Logan		X	"	"
"	"	Van Wert		X	"	"
"	"	Champaign		X	"	"
"	"	Union		X	R. americanum	"
"	"	Richland		X	R. nigrum	"
"	Iowa	Allamakee		X	"	Sept.
"	"	Floyd		X	"	"
"	"	Howard		X	"	"
"	"	Mitchell		X	"	"
"	"	Tama		X	"	"
"	"	Worth		X	"	"
"	"	Delaware		X	"	Oct.
"	"	Dickinson		X	"	"
"	"	O'Brien		X	"	"
"	Mich.	Mackinac	X		P. strobus	May
"	"	Luce	X		"	Aug.
"	"	Oscoda		X	R. cynosbati	"
"	Wis.	Lafayette		X	R. nigrum	Sept.
"	"	Jefferson		X	"	"
"	"	Grant	X		P. strobus	Dec.
"	Minn.	Fillmore	X		"	Aug.
"	"	Fillmore		X	R. cynosbati	"
"	"	Winona	X		P. strobus	May
"	"	Winona		X	R. cynosbati	July

areas show that effective control has been accomplished and that few, if any, new infections have occurred on white pines in such areas. The rust is so widely distributed over the Northeastern States that the region is considered generally infected and no systematic scouting for the disease is necessary.

In the western white pine region of eastern Washington, northern Idaho, and western Montana, there was no extension of the disease reported over that known at the end of the calendar year 1938. Additional infection on Ribes was observed this year in Glacier National Park, and the disease continues to spread rapidly and destructively in such young western white pine [P. monticola] stands of northern Idaho as have not been reached in Ribes eradication work. There are still nearly 800,000 acres of unprotected white pine on quality sites in this region.

In the sugar pine region, the extended hot and dry weather and the lack of favorable winds during the period of canker sporulation appear to have checked the spread of the rust except in the immediate vicinity of pine infection centers, and even here, infection on Ribes was relatively light considering their high susceptibility and the volume of aeciospores produced. This is not unusual, as years in which conditions were unfavorable for rust spread have occurred in the past in other parts of the country.

An examination of the pine infection area along the East Fork of Indian Creek on the Klamath National Forest in California disclosed a pronounced increase in the number of new cankers over those present last year. Infection was found to be distributed on a high proportion of scattered sugar pine [P. lambertiana] seedlings and saplings from the center of infection in 1936 in Section 21, T 18 N, R 7 E, downstream for a mile and up the slopes on both sides for 2 or 3 hundred feet. Cankers number from one to over 100 per infected tree, depending upon the size of the tree and its proximity to the abundant Ribes bracteosum along the creek. Also, trees located close to R. sanguineum bushes scattered through the timber on the hillsides were severely infected. It was evident from an examination of the pine cankers at this location that hundreds of them produced spores this year in contrast to a few at best in any previous year.

The results of scouting in California during the season were negative with respect to the discovery of new locations of infection on Ribes, and there was not only no southward extension of the rust on Ribes beyond that previously reported, but the scouts failed to find infection in 1939 at many locations where it was present on Ribes in 1938. Ribes infection was relatively light, even on bushes close to sporulating pine cankers, and dwindled quickly to scattered spot infections within short limits of the pine-infecting centers. One sugar pine was discovered along Girder Creek on the Klamath National Forest with 4 incipient cankers of 1937 origin. This infection increases the number of places where pines have been found infected in California to 3 and extends the known range of pine infection in the State

to some 14 miles south of the Oregon border. As the disease incubates about 3 years on white pine before it produces aeciospores, any infections on white pines that may have taken place in the last 3 years were still in the developmental stage and some of them probably will begin producing aeciospores for the first time next spring.

VARIETAL SUSCEPTIBILITY OF PEPPERS TO BACTERIAL SPOT

James G. Horsfall and A. D. McDonnell

During September 1939 Phytomonas vesicatoria appeared in epiphytotic form in the large variety and strain collection of peppers at the University of Connecticut, Storrs, Connecticut. Professors A. M. Porter and M. L. Odland kindly gave permission to measure the susceptibility of these varieties to the bacterial spot.

The disease appeared primarily on the foliage, causing typical scabby spots and defoliation.

The plants were grown in from 2 to 4 replicate single-row plots about 20 feet long. In mid-September the plants in each plot were placed by inspection into one of 5 categories as follows: 1--disease free; 2--with a few leaf spots; 3--severely spotted, slight defoliation; 4--up to 50 percent defoliation; 5--more than 50 percent defoliation. The average of all replicates gave an index of disease.

The data obtained appear in the table, where the varieties are grouped according to whether the index of disease fell between 1 and 2 (resistant), between 2 and 3 (somewhat resistant), between 3 and 4 (somewhat susceptible), and between 4 and 5 (susceptible). The results were striking. All 10 strains of Waltham Beauty fell in the first or resistant group. Likewise, Yellow Oshkosh, from which Waltham Beauty was selected, fell in Group 1. The single Waltham Beauty Cross (with susceptible Pimiento) fell in group 1. Sunnybrook itself, a Sunnybrook selection, and Sunnybrook Crosses were resistant. All 3 strains of Squash were resistant. A few strains of Wonder fell in the resistant group. Harris Earliest and Harris Early Giant (from one source) appeared to be resistant but when the seed came from other sources they appeared to be only fairly resistant (group 2). Bullnose was resistant.

Group 2-3 (somewhat resistant) includes all strains of Windsor A and B, most of the strains and selections of California Wonder (most of the rest were in groups 3-4), 2 strains of Asgrow King, Improved World Beater, and all strains of Improved Colossal.

Group 3-4 (somewhat susceptible) includes most of the strains of Giant, the rest of the California Wonder strains, most of the strains of Ruby King, a few strains of King of the North, Special Cheese, and Neapolitan.

Group 4-5 (very susceptible) includes most of the strains of World Beater, most of the strains of King of the North, Pimiento, Rocky Ford, Colossal, Cornelli's Special, Talioncelli, Sweet Mountain, and Prolific Sweet.

Varietal Susceptibility of Peppers
to Phytomonas Vesicatoria, 1939

Varieties showing infection index 1.0 - 2.0:

Bullnose	3 strains	(all)
Waltham Beauty	10 "	(all)
Waltham Beauty x Pimiento	3 "	(all)
Yellow Oshkosh (Waltham parent)	2 "	(all)
Sweet Yellow	1 "	(all)
Harris Earliest	2 "	(all)
Harris Early Giant	2 "	(out of 5)
Sunnybrook 833	1 "	(all)
Sunnybrook Sweet Cheese	1 "	(all)
Sunnybrook x Harris Early Giant	7 "	(all)
Sunnybrook x Cay	(probably 1 strain)	
Harris Early x California Wonder	1 strain	(out of 2)
Harris Wonder	1 "	(out of 2)
Wonder (514, 3877G1)	1 "	(all)
Squash	3 "	(all)

Varieties showing infection index 2.1 - 3.0:

Windsor A	12 strains	(all)
Windsor B	2 "	(all)
Harris Early Giant	3 "	(2 in group 1)
California Wonder x Harris Early	1 "	(1 in group 1)
Jersey Wonder	1 "	(all)
Harris Wonder	1 "	(1 in group 1)
California Wonder	10 "	(out of 19)
Asgrow King	2 "	(all)
Improved World Beater	1 "	(all)

Varieties showing infection index 3.1 - 4.0:

California Wonder	7	strains (out of 19)
Bloomsdale Wonder	1	" (all)
Wonder 4	1	" (all)
Oakview Wonder	2	" (all)
Chinese Giant	3	" (3 out of 4)
Florida Giant	3	" (all)
Ruby Giant	1	" (1 in group 2)
Ozark Giant	1	" (1 in group 2)
Memphis Giant	1	" (all)
Bloomsdale Giant	1	" (all)
Giant	1	" (all)
King of the North	3	" (out of 8)
Ruby King	7	" (out of 8)
Special Cheese	1	" (all)
Neapolitan	2	" (all)

Varieties showing infection index 4.1 - 5.0:

Sweet Mountain	1	strain (all)
Prolific Sweet	2	" (all)
Corneli's Special	2	" (all)
Talionelli	1	" (all)
Colossal	1	" (all)
Rocky Ford	1	" (all)
King of the North	5	" (3 strains in group 4)
World Beater	12	" (all)
Ruby King	1	" (others in group 4)
Pimiento	1	" (all)
California Wonder	2	" (out of 19)
California Wonder x Long Pepper	1	" (all)
Chinese Giant	1	" (out of 4)

It is interesting that these data should indicate such wide differences in susceptibility when Weber (Florida Agr. Expt. Sta. Bul. 244. 1932) found no such differences. Of the varieties listed by Weber, however, none except Bullnose fell in the resistant group in Connecticut. It is worthy of note, therefore, that Bullnose appears to react differently in the South than in the North.

It would appear from the data that resistance is probably inherited as a dominant. Resistant Waltham Beauty crossed with susceptible Pimiento gives resistant progeny. Resistant Sunnybrook gives resistant progeny when crossed with Harris Early Giant, Cay, or Sweet Cheese. Harris Early Giant (resistant) crossed with susceptible California Wonder gives resistant progeny.

Moreover, selections seem to carry the resistance with them, as instanced by Waltham Beauty from Oshkosh.

(Connecticut Agricultural Experiment Station, New Haven).

INCIDENCE OF DISEASE IN COMMON-BEAN-MOSAIC RESISTANT AND NON-RESISTANT GREEN REFUGEE BEANS IN NEW YORK, SEASON OF 1939

Otto A. Reinking

Disease records were taken of Stringless Green Refugee, Idaho Refugee, and U. S. #5 snap beans grown in commercial fields in the Western New York bean area and in replicated plats at Geneva, New York. The accompanying tables present the results of the counts. In evaluating the data it must be borne in mind that they are for one season only. It is believed that this season's records bear out trends shown in past years.

The results of the 1939 field tests show that the common-bean-mosaic resistant types now on the market, Idaho Refugee and U. S. #5, clearly outyielded the non-resistant Stringless Green Refugee bean. This is especially true in cases where the latter type is severely affected with common bean mosaic. In these tests the U. S. #5 somewhat outyielded the Idaho Refugee. It is believed that the lower yield of the Stringless Green Refugee is due in part to the presence of the common bean mosaic, but also possibly in part to an inherent lower yielding character.

The Idaho Refugee and U. S. #5 in commercial field plantings showed no common bean mosaic, while the non-resistant Stringless Green Refugee strains showed almost 100 percent infection in all fields. In replicated plats where all varieties were planted together the Idaho Refugee and U. S. #5 did show a slight infection of from 1 to 4 percent. This may have been due in certain instances to poorly selected strains. From a commercial standpoint it can be stated that the resistant Idaho Refugee and U. S. #5 strains now on the market are highly resistant.

All 3 types under test showed about an equal amount of infection of yellow mosaic. No real losses from this mosaic was noted. In one replicated plat planted near infected white sweet clover a heavier infection was noted. Apparently all 3 types of beans are equally susceptible to infection.

The heritable so-called one-sided variegation in these tests was peculiar to the hybrid Idaho Refugee and the non-commercial Corbett Refugee, which is one of the parents of the former. The disease is identical with that described by Zaumeyer 1/ as a heritable abnormality of beans resembling mosaic. The trouble undoubtedly reduces the quality of the beans owing to crooked pods and must have slightly reduced the yields. It apparently is being selected out of new strains now being developed by commercial seed houses. It is not present in a severe form in the commercial strains of U. S. #5 or the Stringless Green Refugee.

1/ Zaumeyer, W. J. A heritable abnormality of beans resembling mosaic. Phytopath. 28: 520-522. 1938.

Table 1. Yield and presence of disease of bean varieties in commercial fields in New York in 1939.

Variety observed	Location	Total acreage	Yield tons per acre	Percentage of disease: Common mosaic	Yellow mosaic	One-sided variegation
Stringless Green Refugee	Penn Yan	9.07	2.19	99	2.2	0
	Penn Yan	12.00	2.54	98.6	0.6	0.2
	Penn Yan	11.22	2.58	99.2	0.4	0
	Red Creek	8.37	2.43	99.6	6.6	0.2
	Red Creek	10.43	2.53	99.4	2.0	0.2
Idaho Refugee	Rushville	7.21	3.12	0	5.4	23.0
	Rushville	5.39	5.06	0	4.4	27.4
	Seneca Castle	3.33	3.54	0	5.2	22.0
	Marion	6.78	3.41	0	0.8	22.6
	Marion	18.04	4.08	0	3.0	23.4
U. S. #5	Seneca Castle	1.87	4.49	0	5.2	0.8
	Red Creek	0.60	3.40	0	5.0	0.7
	Penn Yan	2.67	---	0	0.8	1.0

Stringless Green Refugee ..... Average yield - 2.45 tons per acre
Idaho Refugee ..... " " - 3.84 " " "
U. S. #5 ..... " " - 3.94 " " "

The records taken on bacterial blight, both common [Phytomonas phaseoli] and halo [P. medicaginis phaseolicola], indicate that the Idaho Refugee and U. S. #5 are somewhat more susceptible than the Stringless Green Refugee, but that the latter also can take a severe form of disease if infected seed is planted. When disease-free seed is planted on healthy soil that had not been in beans for at least a year, severe infection apparently can be avoided.

Table 2. Presence of disease in replicated plats, 1939.

Variety observed	Location	Seed source	Percentage of disease: Common mosaic	Yellow mosaic	One-sided variegation
Stringless Green Refugee	Geneva P.D.G. b/	Idaho	92.7	0.7	0
"	Geneva P.D.G.	Geneva a/	95.9	1.5	0
"	Geneva C.C.F. c/	Michigan (?)	34.0	20.0	1
Keeney's Stringless Green Refugee	Geneva C.C.F.	Wyoming (?)	39.0	35.0	0
Idaho Refugee	Geneva P.D.G.	Idaho	3.7	5.7	22.7
"	Geneva P.D.G.	Geneva a/	.0	3.0	10.0
"	Geneva C.C.F.	Idaho	4.0	5.0	7.0
"	Geneva C.C.F.	Wyoming (?)	4.0	13.0	2.0
U. S. #5	Geneva P.D.G.	Idaho	0	1.3	0
"	Geneva P.D.G.	Geneva a/	0	1.7	0
"	Geneva C.C.F.	Idaho	0	18.0	0
"	Geneva C.C.F.	Wyoming (?)	1	12.0	0
Wisconsin Refugee	Geneva P.D.G.	Geneva a/	0	4.3	8.3
"	Geneva C.C.F.	Idaho 1936	3	18.0	3.0
Corbett Refugee	Geneva P.D.G.	Geneva	0	2.3	27.0

a/ Bacterial blight infected seed.
b/ P.D.G. = Plant Disease Garden - 3 replications in 200 foot rows.
c/ C.C.F. = Canning Crops Farm - 8 replications in 90 foot rows.

Table 3. Bean bacterial blight (common and halo) in New York in 1939.

Variety observed	Location	Acreage	Yield: tons per acre	Seed source	Percentage of bacterial blight: Leaf infection	Severe canker
A. Incidence of disease in commercial fields.						
Stringless Green Refugee	Penn Yan	9.07	2.19	Idaho	3.4	0.0
	Penn Yan	12.00	2.54	"	0.4	0.0
	Penn Yan	11.22	2.58	"	4.2	0.0
	Red Creek	8.37	2.43	"	16.2	0.0
	Red Creek	10.43	2.53	"	7.2	0.0
Idaho Refugee	Rushville	7.21	3.12	"	1.2	0.0
	Rushville	5.39	5.06	"	2.0	0.0
	Seneca Castle	9.33	3.54	"	12.2	0.0
	Marion	6.78	3.41	"	42.8	0.0
	Marion	18.04	4.08	"	51.4	0.0
U. S. #5	Seneca Castle	1.87	4.49	"	24.6	0.0
	Red Creek	0.60	3.40	"	17.3	0.0
	Penn Yan	2.67	--	"	0.2	0.0
B. Incidence of disease in replicated plats: Planted with disease-free seed in an isolated area.						
Stringless Green Refugee	Geneva	90 ft. row	--	Idaho	5.0	0.0
Keeney's Stringless Green Refugee	Geneva	"	--	"	10.0	0.0
Idaho Refugee	Geneva	"	--	"	0.0	0.0
	Geneva	"	--	"	0.0	0.0
U. S. #5	Geneva	"	--	"	3.0	0.0
	Geneva	"	--	"	1.0	0.0
C. Incidence of disease in replicated plats: Infected seed planted alongside disease-free seed. Field planted previous year to beans.						
Stringless Green Refugee	Geneva	200 ft. row	--	Idaho	99.7	6.3
	Geneva	"	--	Geneva*	100.0	64.7
Idaho Refugee	Geneva	"	--	Idaho	100.0	19.0
	Geneva	"	--	Geneva*	100.0	77.7
U. S. #5	Geneva	"	--	Idaho	100.0	16.7
	Geneva	"	--	Geneva*	100.0	91.7

* Diseased seed.
Idaho seed supposedly healthy.

(New York State Agricultural Experiment Station, Geneva).

SERIOUS AND UNUSUAL PLANT DISEASES IN SOUTHWEST TEXAS

P. A. Young and A. L. Harrison

A plant disease survey was made by the writers from November 15 to 21, 1939, in the region from Pleasanton, LaPryor, and Laredo to Mission and Brownsville, Texas. Dr. S. S. Ivanoff aided in this survey in the region near Winter Haven. Among the many plant diseases and abnormalities found, the following attracted special attention:

Yellow-top of tomato was found again (PDR 22: 6-12. 1938) this year in the whole area surveyed, but it was most abundant in the Winter Garden region. Affected plants had a varying number of yellow upper leaves. In 2 tomato fields near Quemado, many of the top leaves were white with brown spots. These symptoms resemble those of eggplant yellows.

Mechanically damaged tomato peels: Serious loss in one packing shed at Laredo and another shed at Mission resulted when green-wrap tomatoes showed broken and slipped cuticle or epidermis, resembling the torn epidermis of immature potatoes after rough handling. The tomatoes were examined in the field and packing shed at Mission, and no evidence was found that the "skinning" of the tomatoes was caused by improper handling. These tomatoes were damaged by methods of handling that did not damage tomatoes handled on other days. Apparently in some fields on November 18 and 20, the tomato epidermis was unusually tender and was damaged by ordinary handling.

Blossom-end rot of tomato was rare or usually absent in the region surveyed where tomatoes were well irrigated. Proper watering probably explains the almost complete absence of blossom-end rot under such conditions.

Root-knot [Heterodera marioni] was found causing serious damage in several fields of tomatoes.

Fusarium wilt of tomato (F. [bulbigenum] lycopersici) apparently is increasing in southwestern Texas, as a few fields near Pleasanton and Weslaco showed 40 to 75 percent of the plants with wilt symptoms.

Buckeye rot of tomato was found appearing first as bright brown, radiate spots that soon developed the typical symptoms of the rot caused by Phytophthora terrestris [P. parasitica].

Tomato pox was first described under the tentative name of fruit mottle (PDR 22: 6-12. 1938). Affected tomatoes were found throughout the area surveyed, but pox was abundant to a damaging extent only near Quemado this year.

Tomato tip blight (probably caused by the tip blight virus) damaged nearly 0.1 percent of the tomato plants in many fields throughout the area surveyed.

Curly top affected occasional tomato plants in the whole area surveyed. It probably is caused by the beet curly top virus, and produced leaf roll symptoms in tomatoes closely resembling leaf roll of Bliss Triumph potatoes. The tomato leaflets were prominently rolled upward and very brittle, with hypophyllous purpling of the main veins.

Tomato mosaics: A few fields near Quemado, Big Wells, and Santa Maria showed 50 to 100 percent of the tomato plants with mosaic mottling, mostly a mild mosaic. However, large percentages of the tomatoes showed crinkle mosaic symptoms apparently caused by the ordinary tobacco mosaic virus. A field at Quemado was damaged by a curly mosaic.

Pepper curly top (probably caused by the beet curly top virus): Affected plants showed the leaf roll symptoms as described for tomato. Pepper curly top was seriously abundant at Winter Haven in one field.

Pepper albinism (probably genetic) was found affecting occasional plants.

Potato calico was found with prominent symptoms in one plant at Weslaco.

Eggplant yellows affected 10 to 30 percent of the plants in 2 fields near Big Wells and Mission.

Eggplant "bunchy top": This tentative name is given to bunchy-top symptoms in several eggplants found near Pleasanton. The symptoms included dwarfing, chlorosis, fasciation, and vein clearing. One of the plants showed narrowed, unusually angular leaves.

Bean halo blight (caused by Phytomonas medicaginis phaseolicola) spotted several plants of bean (Phaseolus sp.) in a large field near Laredo.

Squash mosaic (probably caused by the cucumber mosaic virus) was common in the region surveyed, and in one field near Big Wells all of the squash plants were affected.

Broccoli albinism was found in one plant at Laredo.

Peanut albinism was found in a few plants near Dilley.

Peanut chlorosis affected 10 percent of plants in a field near Dilley.

Strawberry yellows (probably genetic) [? leaf variegation = "Blakemore yellows"]: Many of the young strawberry plants had yellow leaves in an old field of strawberries at Winter Haven.

Strawberry angular leaf spot (caused by Dendrophoma obscurans) affected occasional plants at Pleasanton and Winter Haven.

(Texas Agricultural Experiment Station, Tomato Disease Laboratories, Jacksonville and Yoakum).

CANE-BLIGHT OR DIEBACK OF CURRANT IN NEW YORK

E. M. Hildebrand

For several seasons past a cane-blight or dieback condition has been observed in commercial plantings of red currants (Ribes sativum S.) in the Hudson Valley of New York. For some unknown reason it was greatly augmented in 1939, its most serious aspect being the death in early July of many of the fruit-bearing branches just as the berries were taking on color. Although the Wilder currant, the chief commercial variety, is considered to be resistant to the cane-blight trouble 1/, the wilting of the leaves and shriveling of the fruit gave the plants a very untidy appearance in addition to causing considerable reduction in yield. An active canker was ordinarily found at the base of the affected areas and above it on the stem surface were small dark colored pycnidia containing an abundance of spores.

A fungus was isolated from the active canker area and also from the fruiting bodies which answered the description of Botryosphaeria ribis Gross. and Dugg. reported by Grossenbacher and Duggar (1911) 2/ as causing a cane-blight disease of currants in the same locality as long ago as 40 years. The identity of the fungus has recently been confirmed by Dr. W. Lawrence White, Instructor of Mycology at Cornell.

The isolated fungus grew well on potato-dextrose agar and when held for several weeks pycnidia developed containing spores similar in appearance to those on the stems of the diseased plant. Wound inoculations with this fungus on a healthy plant grown in the greenhouse caused death within 3 weeks time.

1/ Hesler, L. R., and H. H. Whetzel. Manual of fruit diseases, 462 pp. [Currant cane blight, pp. 209-212]. Macmillan. New York. 1929.

2/ Grossenbacher, J. G., and B. M. Duggar. A contribution to the life history, parasitism, and biology of Botryosphaeria ribis. New York (Geneva) Agr. Expt. Sta. Tech. Bul. 18: 114-190. 1911.

It is not known what connection, if any, exists between this disease and other injuries to the stems of currants caused by the stem girdler (Janus integer Norton) and the imported currant borer (Sesia tipuliformis Clerck.) Hesler and Whetzel (1929) state that there is no method of treatment which can be confidently recommended. Certain aspects of the pathology of the disease still need to be worked out before the feasibility of control measures can be established one way or the other.

(Cornell University).

THE FRUIT DISEASE SITUATION IN NORTHERN VIRGINIA DURING 1939

A. B. Groves

The fruit disease situation in Northern Virginia during 1939 was unique in several respects. The situation that developed was in part due to weather conditions and partly to changes in late season spray practices occasioned by attempts to avoid visible spray residues at picking time.

The season opened in late March at near an average date and was in no way unusual. Rain fell frequently in April, but the showers were generally light and of insufficient duration to provide conditions favorable for scab infections. Scab spore discharges were noted twice during April and a few infections were apparent on neglected trees before the end of the month. The month of May proved to be one of the warmest and driest Mays on record, however, and no further opportunity for infection was accorded. The few infections that did occur were rather completely burned out through the combined action of heat and sulfur sprays.

A complete reversal of rainfall conditions began in early June and rain continued to fall frequently and heavily until mid-August. Approximately 17 inches of rain fell during the 2 months of June and July, affording opportunity for an unusually late cedar rust (Gymnosporangium juniperi-virginianae) infection, principally on the foliage. Apple scab (Venturia inaequalis) made some secondary spread where there were scattered primary infections present, but this was generally of little consequence.

The increase in bitter rot (Glomerella cingulata) noted during 1938 continued to gain momentum. The weather was almost ideal for its spread with frequent showers followed by warm, humid days. Many Grimes plantings were reported a total loss from the disease and many plantings of Jonathan, Golden Delicious, Delicious, as well as others, were more or less severely affected. A very considerable number of growers habitually apply no Bordeaux spray after the second week of June, and others who may spray later use only lead arsenate. There was an increase in late season fungicidal spraying in comparison with recent years however. The action of the insoluble coppers against bitter rot was observed in only a few instances, but here control was not satisfactory.

Blotch (Phyllosticta solitaria) is strictly a varietal problem, and with a decrease in the importance of the Northwestern Greening which was never extensively planted, less and less is being observed of this disease. Blotch is universally present in neglected Northwestern Greening plantings and, of course, spreads from these trees to other less susceptible varieties. One instance was observed where the disease regularly spread from the Greening to Stayman and York, but upon the cutting of the former, the fungus was unable to maintain itself even though the trees remained unsprayed. One of the better orchardists has for the past 3 years been actively engaged in eradicating cankers from a young Greening planting that was left unsprayed for the first 5 or 6 years, as is the usual practice.

Black root rot (Xylaris mali) was noted as present on the majority of old trees observed after pulling and appears to be of increasing importance as the age of the orchards increases. Replanting is generally considered futile although the merit of this practice might be questioned were root rot not present. Mouse girdling, drought, and winter injury continue to be important contributing factors in the depredations of this disease.

Internal cork, which is principally a problem on Ben Davis and Gano, has ceased to be troublesome after boron applications became general. The need for a second application has not appeared as yet, but may very well begin to appear within the next year or two should the observations of investigators in certain other sections be applicable here. Applications of borax and boric acid have been made to Delicious trees severely affected with internal bark necrosis and after 2 years the trouble seems to be less severe, the affected area smaller and shallower, with a diminishing of the necrotic phase and a consequent relative increase in the dark green areas. The total affected area seemed to be reduced. The dieback symptoms also appear to have been checked. The trees were approximately 18 years old and have been severely affected for several years. Such trees could scarcely be expected to respond as quickly as very young or potted trees.

Relatively little fire blight (Bacillus amylovorus) [Erwinia amylovora] was observed during the past year, there being more twig than blossom blight. Some Jonathan plantings showed numerous blighted shoots but after the progress of the disease had been arrested it was evident that the actual loss was inconsequential. There might have been a greater spread had May been less warm and dry.

Frog eye (Physalospora obtusa) was not severe during 1939. Black rot did cause some more trouble than usual due to the frequent rains throughout the first 2 months of summer. Losses were scattered rather than general.

Blister canker (Nummularia discreta) is still quite prevalent but seems to be causing no trouble except where growers have made injudiciously large pruning cuts. Protective paints have been generally disappointing in this connection. The death of more or less woody tissue that necessarily follows such an extensive disruption of the vascular system affords an excellent avenue for entrance and establishment of the fungus.

The sudden severe early cold spell of November 1938 resulted in considerable winter injury as had been more or less expected. The most conspicuous phase of this injury was the extensive killing of lateral buds. The injury was sufficiently severe to produce a "mule tail" effect on the terminal branches, particularly on younger trees. Buds weakened but not killed by this cold spell were more easily injured or killed by the usual dormant and delayed oil spray applications. Many growers placed all of the blame on the spray, but actually there seems little doubt that winter injury was a principal if not the major factor. Injury was most severe where oil sprays containing dinitro-ortho-cyclo-hexylphenol were used.

There was more typical frost injury observed during the 1939 season than at any time during the past 10 years. This is not to say that there was the greatest amount of actual damage or loss, but rather that there were more typical evidences of injury such as frost rings, crimped leaves, etc. Frost rings were observed more commonly on Stayman than any other variety; in fact, such rings were frequently abundant on this variety in interplanted orchards where the condition was entirely absent on another variety or varieties. This was true even with such a closely related variety as the Winesap.

Sooty blotch (Gloeodes pomigena), fly speck (Leptothyrium pomi), Brooks' spot (Mycosphaerella pomi), blister spot (Pseudomonas [Phytomonas] papulans), and other minor infections were more prevalent than usual as a result of the frequent summer rains and the abbreviated fungicide schedules of most growers in recent years.

Spray injuries were not unusually prevalent or severe, although a few developments deserve to be mentioned and recorded. The first of these was the dormant oil injury which has already been mentioned. Conditions were not unusually favorable for sulfur injuries during April, but some severe leaf scorching developed where growers had used elemental sulphurs with an inverted type oil emulsion as a sticker to obtain a heavier load. Several factors were involved and it would be quite difficult to correctly evaluate the respective roles and interactions of the oil, high temperatures, lack of rainfall, and heavy sulfur deposits. The injury disappeared after frequent rains set in during June.

A third most interesting spray injury development came in late July. Several growers made a Bordeaux mixture application on or near the 25th of the month for the control of bitter rot. Most of these growers used no arsenical at the time. Injury following this application was immediate and spectacular; anywhere from a few to all of the outside leaves of the tree were killed so quickly that many remained green although dead and quite brittle. Injured blocks were readily visible for a distance of 2 miles in one instance. There was no immediate fruit injury, although there was some sun-scalding later. Injury was most severe in well sprayed orchards. The injury was also observed in a less severe form in experimental blocks with certain other copper materials, but nowhere was it as severe as with Bordeaux mixture. No adequate explanation can be offered for the injury, although it is suggested that the frequent rains, together with intermittent sunshine and the respiratory activities of the leaf, may have so affected the remaining arsenical residue from June applications that the Bordeaux in some way suddenly released it upon its application. The injury was certainly more typical of a soluble arsenical such as an arsenite than of copper. The fact that the leaves were very tender as a result of rapid and vigorous growth was probably an important contributing factor to the injury.

Peach leaf curl (Exoascus [Taphrina] deformans) was no more severe than usual. The well-cared-for orchards scarcely show the disease and the poorly sprayed ones were probably half defoliated.

Brown rot (Sclerotinia fructicola) caused more than the usual loss, as would be expected following frequent and heavy summer rains. Control was obtained without unreasonable difficulty in those orchards where frequent sulphur applications were made. The practice of making an immediate pre-harvest sulfur application to carry through the picking season proved definitely worthwhile in 1939.

Peach scab (Cladosporium carpophilum) is ordinarily no problem in this section and gave the average commercial grower no trouble. One 30-acre orchard observed was a total loss because of scab, however. The trees received no fungicide after the dormant.

Yellow-red virosis (X-disease) of peach has not been observed as yet. The choke cherry, Prunus virginiana, does not seem to occur in the vicinity of peach plantings in northern Virginia and this fact may constitute a barrier against the spread of the disease into this section. The red suture disease has been reported from Maryland, but has not been observed in this section as yet. Yellows continues to be relatively common, occurring principally in old home orchards. There seems to be no active spread of the disease.

The few pears that are grown in this section are old neglected Kieffer plantings that are not generally in good enough vigor to develop a severe case of fire blight. Better care with fertilization, pruning, etc. would probably be rewarded with more trouble with this disease.

The sour cherry suffered more from cherry leaf spot (Coccomyces hiemalis) than usual last year. Most plantings are sprayed inadequately if at all and as a result many orchards were almost totally defoliated by mid-summer.

(Virginia Agricultural Experiment Station).

NOTES ON FRUIT DISEASES IN THE OZARK SECTION OF MISSOURI IN 1939

M. A. Smith

Apple scab (Venturia inaequalis): Rainfall during the month of April totalled 6.27 inches. A heavy discharge of ascospores was observed during the period April 16-17. By May 1 primary infection had occurred on foliage of Rome Beauty, Ben Davis, and McIntosh. Fruit infections were very numerous by the last week of May. Pedicel infections were commonly seen. Rainfall was well distributed throughout June and by the middle of that month the disease had caused considerable damage to foliage and fruit in orchards where thorough spraying had not been practiced. In a survey made in mid-July, marked defoliation due to apple scab was observed in a number of orchards in the Ozarks. Further spread of the disease was checked by the high temperatures in early July.

Bitter rot (Glomerella cingulata): Bitter rot was observed in orchards in southeastern, southwestern, and east-central Missouri this year. This disease has undoubtedly increased during the past 3 years. It was observed on the varieties Willow Twig, Ben Davis, Grimes Golden, and Golden Delicious. In one orchard in Cape Girardeau County bitter rot was so severe that to obtain control it became necessary to remove all infected apples from the orchard in addition to making Bordeaux applications.

The disease was also observed in Pike County, Missouri. This is 150 miles north of the area where bitter rot outbreaks have previously occurred and is the farthest north in the State that the disease has been found.

Apple blotch (Phyllosticta solitaria) was seen in a few orchards in 1939 but assumed no commercial importance.

Peach leaf curl (Taphrina deformans) was less prevalent this year than in 1937 or 1938. It was observed only in a few scattered orchards.

Pear leaf spot (Fabraea maculata) was less prevalent in 1939 than in 1938. The canker phase of the disease was observed in only 3 orchards.

Cherry leaf spot (Coccomyces hiemalis): This disease appeared on foliage 2 to 3 weeks later this season than in 1938. No fruit infections were observed. Unsprayed trees were defoliated by August 15.

Cedar apple rusts (Gymnosporangium spp., Gymnosporangium juniperi-virginianae, and G. globosum) were widespread in Missouri in 1939. G. germinale [G. clavipes] was not so prevalent this year as in 1938 and 1937.

(Division of Fruit and Vegetable Crops and Diseases, U. S. Bureau of Plant Industry. December 13).

QUOTATIONS

"Experimentalists are understandably impatient of data beyond reach of their breeding tests. But we should remember that the present age of experiment will some day be combined with an age of fuller correlation, when the inconceivably rich mine of factual matter now buried in the text of ten thousand outdated books will be drawn upon, and when zoological collections, no less than zoological literature, will be combed for now ignored truths that can then be properly fitted into the picture of life as a whole. We museum men collect and preserve not only with respect to our individual scientific predilections; rather, we may be said to share some of the characteristics of devoted librarians. We feel a heavy responsibility to lay up, while opportunity offers, a capital sum of the irreplaceable data of science, even though part of this fortune may not begin to bear interest at its proper rate for a long time to come." --Robert Cushman Murphy, The need of insular exploration as illustrated by birds. Science n. s. 88: 533-539. Dec. 9, 1938. Quotation from page 539.